

## ABSTRACT OF THE DISCLOSURE

Commercially viable methods of manufacturing p-type group II-VI semiconductor materials are disclosed. A thin film of group II-VI semiconductor atoms is deposited on a self supporting substrate surface. The semiconductor material includes atoms of group II elements, group VI elements, and one or more p-type dopants. The semiconductor material may be deposited on the substrate surface under deposition conditions in which the group II atoms, group VI atoms, and p-type dopant atoms are in a gaseous phase prior to combining as the thin film. Alternatively, a liquid deposition process may be used to deposit the group II atoms, group VI atoms, and p-type dopant atoms in a predetermined orientation to result in the fabrication of the group II-VI semiconductor material. The resulting semiconductor thin film is a persistent p-type semiconductor, and the p-type dopant concentration is greater than about  $10^{16}$  atoms·cm<sup>-3</sup>. The semiconductor resistivity is less than about 0.5 ohm·cm.